Statistical Analysis of Axle Load Data and its Influence on Pavement Damage

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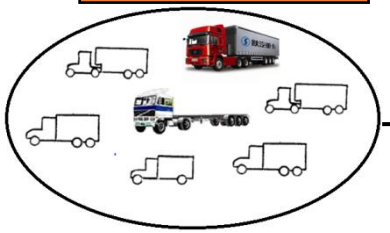
Introduction

Static axle load survey



Equivalency factors

Damage concept

No. of repetitions of

Standard axle load of 80kN

Design traffic

Problem Definition

1. Conventional methods to estimate design traffic assumes axle load spectra to follow uniform distribution

But follow multi-modal patterns

2. Conventional pavement design approaches estimate damage based on static axle load data

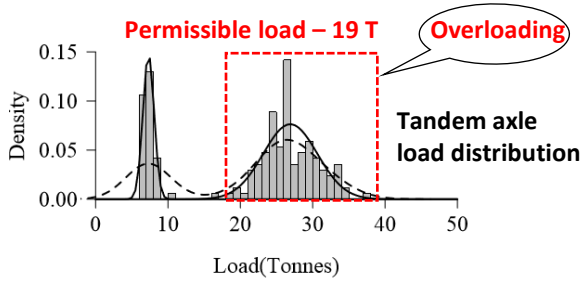
Actual load transferred to the pavement – Dynamic in nature

NB:- Weigh-in-Motion system cannot capture dynamic load due to Vehicle manoeuvre and road roughness

Objectives

1. To perform statistical analysis on the axle load data

Example



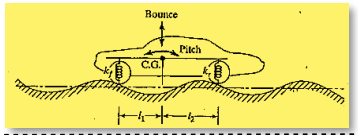
Extreme value distributions for Overloaded axles

2. To generate dynamic loads corresponding to the real time static axle loads with the help of a vehicle dynamics software and estimation of damage

Vehicle manoeuvre
- ✓ Steady speed
- ✓ Acceleration
- ✓ Braking

Dynamic load

Road roughness



Vehicle suspension system